# Pump & Motor Services

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Proprietary and Confidential
OVERVIEW

GREATER RELIABILITY. INCREASED PERFORMANCE.

Our proven one-stop Pump and Motor team provides solutions that you need.

The AREVA group has teaming agreements to provide you with the right resources, when you need them, for Primary Pump (PHT and recirculating), Motor and Seal maintenance. All types of motors and any kind of pump, service or seal. AREVA has a field-proven track record of success:

• In 2011, the supply of four Primary Heat Transfer Motors for the Darlington Nuclear Generating Station
• More than 70 Pump and Motor refurbishment projects in the U.S.
• Over 40 Primary Pump replacements and inspections in the U.S.
• Over 200 Pump and Motor projects worldwide
• Thousands of inspections on primary motors and hydraulic components
• Removal of 150 Motors
• Refurbishment of 130 Motors
• Over 50 vibration analysis/diagnostic/balance service contracts

This experience, coupled with our already large technology portfolio – leads you safely to the finish line for whatever Pump and Motor challenges you may face. Our team is committed to enhancing plant reliability and minimizing impact on outage schedules.

We enable you to reduce maintenance costs by providing a wide range of on-site and off-site field services for:

• Component upgrades and modifications
• Comprehensive parts supply
Pump & Motor Services

- Rapid delivery of parts using off-site inventory management
- Primary Pumps and Motors
- Auxiliary Pumps and Motors
- Seals
- In-Service diagnostics to identify performance issues before they become an operating problem

AREVA also has a broad range of capabilities of our Field Service Crews that include:

- Motor inspection, replacement and repair
- Pump internals inspection, replacement and repair
- Non-Destructive Examination (NDE)
  - 10 year ISI or RCFM Flywheels
  - Case inspections
  - General NDE
- Diagnostics:
  - Motor current signature analysis
  - Remote visual inspection
  - Vibration monitoring packages
  - Vibration analysis and balancing
  - Full range of electrical testing, including partial discharge testing
- Advanced Measurement Techniques:
  - Photogrammetry
  - Casing Flatness
  - Pump Shaft Straightness
Motor Diagnostics
Our online diagnostic system, utilizes electrical signature analysis to detect a variety of malfunctions such as broken rotor bars and efficiency losses – without downtime. Data can preclude unnecessary disassembly and identify the precise location where repairs are necessary.

Replacement Stators
For stator failures resulting from insulation deficiencies or stator end-turn reinforcement issues, our team offers new replacement stators.

Our new replacement stators are more economical than conventional stator rewinds. They are available to fit virtually any motor design, require inspection only every 15 years, and have never failed in service. Each stator has a two-year shelf life and a five-year operational warranty.

Delivery for the first stator requires an additional time for reverse engineering, however delivery of additional stators, of the same design, are comparable to that of a normal core replacement. Our primary stators and motors are designed for 4,000 starts – delivering optimum reliability and performance.

Enhancing Performance – Upgrades for Westinghouse Motors
Our upgrades for Westinghouse motors feature:

• Uniquely designed viscosity pumps crafted from the finest hard piping and pipe/thrust runner seals
• Oil lift systems
• Multi-port drain sumps

Other upgrades and modifications are available.
RCP SEALS
A New Solution with Expanded Innovations in Service

Our team’s on-site seal maintenance and off-site seal remanufacturing and qualification tests help reduce costs and enhance efficiency. This step-by-step process includes advice and consultation, parts and procedures, and support by a fully stocked parts centre with 24/7 online ordering. On-site activities include:

- Seal removal
- Replacement
- Tear-down
- Inspection
- Reassembly featuring new, fully warranted consumable parts

Our off-site seal remanufacturing and seal qualification testing is the only service of its kind in the world. Using our full-speed, dynamic seal tester, the new or rebuilt seal is subjected to a series of simulated operating conditions before it is installed in your plant. This approach offers several cost-effective benefits:

- Precludes unnecessary replacement parts and risk of downtime
- After remanufacturing, we warrant the re-qualified seals as new
- The power of experience – more than 150 seal assemblies have been re-qualified by our team in only 10 years

Our Nuclear Parts Centre can also provide new RCP seals, remanufactured seals, and seal parts to replace original parts. The option of remanufactured seals can save customers over 40% of the cost of a new seal. All remanufactured seals are returned to an “as new” condition, backed by our standard one-year warranty.
PUMP AND MOTOR SERVICES CENTRE

Recognized globally as an experienced and dedicated service provider, AREVA is a world leader in pump and motor repair, refurbishment and replacement. To prove our commitment to success, in 2004 we built a 70,000 square-foot Pump and Motor Service Centre (PMSC) in Lynchburg, Virginia. This high-tech investment substantially increases our service capacity. With a hot machine shop, more than 30,000 square feet of Radiologically Controlled Area (RCA), and 15-, 25-, and 75-ton crane capacities, the PMSC expands our capabilities to help you remain competitive and profitable.

Our extensive capabilities include:

- Contaminated and safety-related motor refurbishment
- Motor stator and rotor testing and repair
- Primary pump and BOP refurbishment and repair
- Auxiliary pump and motor refurbishment and repair
- Extensive decontamination capabilities
- Contaminated dynamic balance capability
- Complete hot machine shop capability
- Variable speed drive test facility
- Contaminated machining
Balanced Performance and Precision

AREVA's Pump and Motor Service Centre is a state of the art facility with the following capabilities:

- Complete motor refurbishment
- Detailed mechanical and electrical inspections
- Non-destructive examinations
- Extended no-load test run capabilities
- Balancing and vibration analysis
- Design engineering support
- Motor rotor repairs
- Upgrades and modifications
- Journal polishing
- Coupling repairs
- Flywheel repairs
- Pump shaft repairs
- Impeller repairs
- Auxiliary pump and motor turning
- Extensive decontamination capabilities

AREVA provides solutions to minimize downtime and get you back on the grid. In addition to providing reverse engineering capabilities for other Pump and Motor brands, we are the only nuclear supplier to continue manufacturing primary system components.
Enhance Plant Reliability

AREVA’s pump and motor service teams have both the resources and world-class facilities to inspect, repair and refurbish primary heat transport and auxiliary pumps, motors and seals either on- or off-site. Coupling these advantages with our already large technology portfolio – we are leading the way in pump and motor services, while enhancing plant reliability.

Overcome Emerging Challenges

In addition to constructing the PMSC, we have completed a significant number of pump and motor field projects. With our in-depth knowledge and proven experience we can conduct proactive, in-service diagnostics to identify performance opportunities before they become an operating problem.

Component degradation, leaks and excessive wear are all age-related problems that contribute to the increasing demand for pump and motor repair, refurbishment and replacement. AREVA built the PMSC to overcome these emerging challenges.
Performance Analysis

Electric Motor Performance & Trending Hardware (EMPATH™ 2000)

Electric motors and mechanical systems are subject to deterioration and damage that can suspend operations, leading to expensive repair and downtime. AREVA offers the Electric Motor Performance Analysis & Trending Hardware (EMPATH™ 2000) to obtain information on critical processes and equipment. The key to EMPATH™ 2000’s successful track record is our innovative Motor Current Signature Analysis (MCSA) technology.

The Extensive Reach of MCSA

When an electric motor drives a mechanical system, it experiences variations in load caused by gears, pulleys, friction, bearings, and other conditions that may change over the life of the motor. The variation in load causes a variation in the current supplied to the motor. These variations modulate the carrier frequency (normally 60Hz) and appear as sidebands in the spectral plot.

With EMPATH™ 2000, an exclusive process demodulates the signal from the carrier and presents an unambiguous spectral display. Using normal and demodulated data permits analysis of the motor, driven equipment and supplied power.
The EMPATH™ 2000 system includes a laptop computer with AREVA’s exclusive signal conditioning board, a 16-channel, 16-bit A/D card, and analysis software to store data and give a readout of the time and frequency signatures. The signal conditioning hardware contains isolating circuits for the voltage inputs and collects data on all three phases of voltage and current, and provides MCSA-filtered signals. Two general purpose voltage channels allow you to collect MCSA data and other data simultaneously.

**Flexibility, Convenience and Early Detection**

The EMPATH™ 2000 software uses an innovative Fast Fourier Transform to provide spectral analysis of all inputs. The system promotes flexibility by allowing periodic data collection through a laptop or continuous data collection via a permanent installation. You can conveniently measure and analyze electric motor current and voltage to detect potential motor problems early – enabling timely repairs and avoiding serious damage.
Technical Specifications

Input
- Three Phases of Current (A, B, C)
- Three Phases of Voltage (A, B, C)
- Two Auxiliary Inputs

Output
- Three Conditioned Currents (A, B, C)
- Three Conditioned Voltages (A, B, C)
- Phase A RMS Current Level
- Phase A RMS Demodulated MCSA Signal
- Two Isolated Auxiliary Signals

Sample Data
- 16 Channel, 16 Bit

Analog to Digital Converter
- Sample Rates up to 100,000 samples per second

Software
- Automatically marks traces
- Automatically adjusts gain and filter parameters on the EMPATH™ 2000 Card
- Adjusts sampling frequency and length of input sample
- Displays time and frequency data with cursors to read actual values
- Retrieves past data and compares with present data via plot overlays
- Prints each of the displays

EMPATH™ 2000 indicates
- Small bar deterioration
- Rotor eccentricity
- Stator phase imbalance
- Motor speed and slip
- Gear and belt imperfections
- Average running current, an indicator of motor torque
- Stroke time on assemblies with defined start and stop points
- Changing friction forces
- Torsional vibration and dynamic loading
- Bearing degradation

In the HI data, EMPATH™ 2000 provides three phases of current and voltage and their associated spectra. An automatic on-screen assessment of the motor’s health is also available for viewing immediately after the data is acquired.
ELECTRICAL SIGNAL ANALYSIS – E-PLUG
 Enhance Motor Analysis Safety

Convenient and Practical

AREVA’s E-Plug hardware permits the acquisition of motor electrical signature analysis data at a Motor Control Centre (MCC) without opening the MCC door. The user simply attaches a connector to the door, while cable from the innovative E-Plug module passes voltage and current data from probes inside the MCC to the connector. The connector then mates with a cable that permits direct feed in to EMPATH™ 2000, expediting electrical signature analysis.

The E-Plug’s efficient design comprises of an enclosure with external attachment leads. Both current and voltage signals pass through these leads. Inside the enclosure, electronic circuitry processes the signals to prepare them for output to the through-door connector. In short, E-Plug contains everything you need for efficient signal transmission.

Inputs to the E-Plug Module

Power cables to the motor pass through current transducers (CTs) that measure the current flowing through the cable and produce a voltage output proportional to the current flowing to the motor. The voltage output from the current transducers is typically tens of milli-volts per amp, yielding an upper limit of 10 Vac for the current transducer output.

Fused wires attached to the power cables provide a voltage signal to the E-Plug module. For supplied power up to 600 Vrms, the E-Plug module will be directly connected to the voltage signal. For supplied power above 600 Vrms, output from existing potential
transforms (PTs) will step the voltage down to 120 Vrms prior to feeding to the E-Plug Module.

**Outputs from the E-Plug Module**

The outputs from the E-Plug Module to the MCC through-door connector are 5 Vac peak for both current and voltage, limiting external voltages at the MCC door to 5 Vac peak. All outputs from the E-Plug Module provide a frequency response from DC to 5 kHz. The accuracy of all outputs is ± 3%.
PUMP & Motor
Services

PUMPS

PRIMARY PUMPS
Serving All Types of Primary System Pumps

By combining our experience with our wholly-owned subsidiary JSPM, as well as our exclusive teaming with major pump OEM’s, AREVA has the global resources to service all makes and models of Primary System Pumps. In fact, our highly responsive teams have more than 20 years of service experience with Byron Jackson-design pumps, and more than 30 years of manufacturing and service experience with Westinghouse-design pumps.

Tailored Services

We offer efficient on- and off-site work and refurbishment for all primary, auxiliary and balance of plant pumps components. We combine our field-proven techniques, personnel and experience to inspect, repair, refurbish and test primary pumps. By tailoring our services to our customers’ needs, we can take the worry out of your specific challenges.

Our dedicated professional pump services team members are experts in providing greater reliability and increased performance for all of your primary system pump needs.

A Complete Range of Services

AREVA’s comprehensive services include seal inspection, replacement and repair both on- and off-site. Our team’s on-site seal maintenance and off-site seal remanufacturing and qualification tests help reduce costs and enhance efficiency. Our services are all- inclusive, with advice and consultation, parts and procedures, and support from our fully stocked U.S. Nuclear Parts Centre (NPC) with 24-hour, on-line ordering.
NPC can also provide new RCP seals and seal parts to replace original parts. Additionally, we offer the option of remanufacturing seals. This option returns remanufactured seals to an “as new” condition, backed by our standard one-year warranty, and saves customers over 40% of the cost of a new seal.
AUXILIARY PUMPS
A Global Leader

Recognized as a global leader in nuclear pump services, AREVA works with exclusive teaming with major pump OEM’s, to offer the procedures, processes and controls to service every type of pump – including contaminated, non-contaminated, safety-related, and non-safety related pumps.

Service Centres to Meet your Every Need

AREVA also features both on- and off-site capabilities, with extensive 24-hour services. Our experienced field engineering staff performs design configuration change and control, pump improvements, design analysis and certification, and material/construction upgrades. We are capable of solving a wide range of challenges for virtually all OEM pump types.

Unparalleled Technical Features

AREVA offers repair, refurbishment and pump upgrades for all nuclear plant pump services and original equipment manufacturers (OEMs). Our wide range of services includes:

• Basic and complex pump repairs on all makes and models of centrifugal pumps
• Component fabrication
• Parts manufacturing
Pump & Motor Services

- Balancing
- Hydro-testing
- Performance testing (non-contaminated)
- Non-Destructive Examination (NDE)
- Design
- Field engineering

The list of product types we can service includes horizontal/vertical single-stage and multi-stage pumps, barrel pumps, and radial/axial split pumps.
MOTORS

PRIMARY MOTORS

Your One-Stop Solution

With the capability to upgrade and modify all types of primary motors – including Westinghouse, Allis Chalmers, Baldor/Reliance, General Electric and Jeumont, AREVA’s pump and motor team is your one-stop solution for every motor-related need.

A sampling of our extensive capabilities includes:

- Complete motor refurbishment capabilities
- Detailed mechanical and electrical inspections
- Non-Destructive Examinations (NDE)
- Extended no-load test run capabilities
- Balancing and vibration analysis
- Motor rotor repairs
- Variable speed drive test facility

By practicing preventative maintenance we increase plant reliability, helping our customers stay competitive and profitable. Services included in our preventative maintenance program include innovative diagnostic solutions, replacement stators, complete motor refurbishment, and numerous upgrades – all proactive services that can solve motor-related problems before they even occur.
Innovative Solutions for Stator Failures

We also provide solutions for stator failures that result from insulation deficiencies and stator end-turn reinforcement issues. Our replacement stators are available to fit virtually any Primary Coolant Pump Motor design, and have never failed in service. Inspection is only required once every fifteen years.

And our lacing technique improves mechanical performance and provides more consistent spacing to enhance cooling.

What’s more, we have performed hundreds of detailed inspections on all parts and components of both PWR and BWR motors during disassembly for refurbishment. Our highly responsive teams, combined with extensive global resources, deliver results that get the job done right.
AUXILIARY MOTORS AND BALANCE OF PLANT

Drawing on the experience of Siemens and JSPM, the ability of AREVA to perform motor repair, refurbishment, replacement and inspection is peerless – applying to all nuclear motor services and original equipment manufacturers (OEMs). Coupled with our capability to service all contaminated, and/or safety related motors, AREVA is clearly your one-stop shop for motor services.

A sampling of our qualifications includes:

- Extensive decontamination capabilities
- Contaminated dynamic balance capability
- Complete hot machine shop capability
- Motor testing and repair
- Contaminated and non-contaminated motor refurbishment
- Variable speed drive test facility
- 10CFR50 Appendix B QA Program – Safety Related

AREVA’s world-class facilities and teaming resources contribute to both on- and off-site inspection, repair, and refurbishment of auxiliary motors. Our responsive, experienced personnel perform a wide range of services and have the capability to solve all types of motor and system problems on virtually all OEM motor types. We can tailor solutions to your specific needs.
REPLACEMENT AC INDUCTION MOTORS

Motor Failures Impacting Nuclear Plant Power Production
INPO reports that large motor failures continue impacting nuclear plant power production. These motor failures are typically the result of aging, older manufacturing inefficiencies, or inappropriate plant maintenance. The bottom line? You lose power generation and revenue. Combine this with the trend toward plant life extension and power uprates, and the potential for problems is real. At AREVA, our Motor Services Team can help you achieve greater reliability and increased performance for your large motors. We have an OEM relationship with Siemens, the leading worldwide provider of NEMA and ANEMA motors. In addition, Siemens is the OEM supplier for the former Allis-Chalmers and Siemens-Allis motor lines.

Hundreds of Motor Types

Siemens motors are available in hundreds of motor types, sizes, ratings and modifications. The following are some of the characteristics:

• Integral horsepower (hp) to 50,000 hp
• Horizontal and vertical orientation
• Environmental qualification for mild and harsh environments
• 10 CFR 50 Appendix B program
• Full-line of enclosures, ODP, WPI, WPII, TEFC, TEAAC, TEWAC and TEXP
Enhanced Design

Our specifications for NEMA and ANEMA motors feature enhanced design innovations to overcome the challenges of motor failure trends and eliminate the worry of failure. These innovations include:

- Upgraded insulation for nuclear plant applications
- System materials with an optimal combination of electrical, mechanical, chemical and radiation resistant properties
- Extended-life bearings
  - Sleeve bearings for ANEMA motors
  - Anti-friction ball or roller bearings for NEMA and ANEMA motors
  - Improved lubricants for nuclear service
- IEEE841 and NEMA premium efficiency levels that result in low heat rejection per unit horsepower and lower power consumption
- Variable frequency drives to control motor speed and reduce power consumption by eliminating the need to throttle flow

A Total Solutions Provider

As your total motor solutions provider, AREVA is committed to enhancing plant reliability and minimizing impact on outage schedules. Our depth of experience, global resources and responsive teams can help you achieve greater reliability and increased performance.
Technical Support

To help you analyze your current situation, we provide:

- Motor inspection, repair or replacement
- Repair or replacement analysis
- In-service diagnostics to identify performance issues before they become an operating problem
- Motor current signature analysis using EMPATH™ 2000
- Vibration analysis and balancing
- Full range of electrical testing including partial discharge testing and PDMA analysis
- Complete engineering test options
- Advanced, high-tech facility devoted to pump and motor service
- A wide range of motor voltages, frame sizes and horsepower to meet your needs

When replacement is better than refurbishment:

- Many times replacements have better efficiency than motors manufactured 20-30 years ago, meaning lower operating costs for your plant
- Often a replacement motor can be provided at the same or less cost than a refurbished motor
- Our dedicated team develops the technical specifications for each new motor per user requirements while ensuring that the motors meet qualified configurations
- New, improved motors can increase your margin in-plant house loads, heat loss, cooling systems and qualification
REPLACEMENT BALDOR/RELIANCE MOTORS

INPO reports that large motor failures continue impacting nuclear plant power production. These motor failures are typically the result of aging, older manufacturing inefficiencies, or inappropriate plant maintenance, resulting in the loss of power generation and revenue. Combined with the trend toward plant life extension and power uprates, and the potential for problems is significant. At AREVA, our Motor Services Team can help you achieve greater reliability and increased performance for your large motors – throughout the life of your plant.

We have expanded our product line base to include motors manufactured by Baldor/Reliance Electric. Through our teaming agreement, we can supply new replacement Baldor/Reliance motors as well as Reliance replacement motors for other OEM motor suppliers. Baldor/Reliance is one of the leading worldwide providers of NEMA and above-NEMA motors for both safety and non-safety applications.

Total Motor Solutions Provider

As your total motor solutions provider, AREVA is committed to enhancing plant reliability and minimizing impact on outage schedules. To help analyze your current situation, we provide:

- Motor inspection, repair or replacement
- Repair versus replacement analysis
- In-service diagnostics to identify performance issues before they become an operating problem
- Motor current signature analysis using EMPATH® 2000
- Vibration analysis and balancing
- A full range of electrical testing
Replacement: Better Than Refurbishment

- Replacements have better efficiency than motors manufactured 20-30 years ago. This means lower operating costs for you.
- We can provide a replacement motor at the same or less cost than a refurbished motor.
- Our dedicated team develops the technical specifications for each new motor per user requirements while ensuring that the motors meet qualified configurations.
- New, improved motors can increase your margin in-plant house loads, heat loss, cooling systems and qualification.

Technical Specifications

- Range of motor types: fractional to 10,000 horsepower.
- 208 to 13,200 volts, 50 or 60 Hz.
- Class 1E: IEEE 323,344,429,334 and 117 and NUREG 0588 Rev. 1.

The Baldor/Reliance Electric product line encompasses over 250,000 ratings, types, styles and sizes. Some of the characteristics of the Reliance motors include:

- Class 1E harsh or mild environmental qualification.
- NEMA and above-NEMA.
- Supply both horizontal and vertical motors.
- Comprehensive documentation capabilities.
- Complete test option.
- ISO certification.
- 10CFR50 Appendix B program.
- Radiation levels to 2 x 108 rads.
AREVA’s Motor Services Team has expertise ranging from motor inventory assessment and criticality analysis to online testing and preventive maintenance task selection. As many utilities embrace license renewal, a well-developed motor management plan is essential to achieving the next 20 years of plant life.

Electrical Motor Testing

Diagnostics technologies can provide valuable insights into motor health. AREVA’s approach to motor testing includes both offline testing and online techniques. AREVA offers proven solutions to conveniently measure and analyze electric motor current and voltage. The EMPATH® 2000 system represents an industry-leading analysis and trending tool for electric motors. Now, many of the core capabilities of the EMPATH™ 2000 system are also available in a very compact and affordable motor analysis system known as EMPATH Jr.

Enhanced Motor Reliability

Our system engineers, motor specialists and skilled field application personnel understand the motor life cycle. Using proven Reliability Centred Maintenance (RCM) and Life Cycle Management (LCM) methods, they can:

- Classify and prioritize your motor fleet
- Identify appropriate preventive and predictive maintenance tasks
- Recommend an appropriate aging and obsolescence strategy
- Develop an appropriate replacement and refurbishment plan
- Assist in plan finalization and execution
AREVA will evaluate workforce utilization, computerized maintenance management system data, spare parts stocking, and targeted use of cost-beneficial predictive technology. We provide a documented basis for all maintenance activities as well as feedback mechanisms to support continuous maintenance program improvements. To troubleshoot complicated motor problems, AREVA offers a toolbox full of advanced analysis methods.

Techniques include rotor-dynamic analysis, finite element analysis and advanced vibration analysis.

**Nuclear Modification Packages**

AREVA offers a comprehensive approach to the motor design modification requirements of nuclear plants. We bring expertise in original plant design and plant system engineering including electrical, instrumentation and controls, and civil and mechanical disciplines. Much of our success has been achieved by applying technical innovations that result in practical solutions with reduced operation and maintenance costs.
PUMP AND MOTOR FIELD SERVICES
A Global Leader

Recognized globally as an experienced and dedicated provider of pump and motor services, AREVA stands ready to take on your every pump and motor need. What’s more, we can perform all of our comprehensive field services on-site.

A Wide Range of Services

AREVA has the ability to perform component change-outs including pumps, motors and seals. We offer an extensive list of additional services, including:

- Seal inspection, replacement and repair
- Motor inspection, replacement and repair
- Pump internals inspection, replacement and repair
- Non-Destructive Examination (NDE) (including: 10-year ISI or RCFM flywheels, case inspections and General NDE)
- Diagnostics
  - Motor current signature analysis using EMPATH™ 2000
  - Remote visual inspection
  - Vibration monitoring packages
  - Vibration analysis and balancing
  - A full range of electrical testing, including partial discharge testing
  - Diapo
- Advanced measurement techniques
  - Photogrammetry
  - Casing flatness
  - Pump shaft straightness
Pump & Motor Services

Broad OEM Experience

With an extensive repertoire of experience on most Original Equipment Manufacturer (OEM) pumps and motors, including Westinghouse, General Electric, Siemens, Allis Chalmers, Bingham, Byron-Jackson, and JSPM, we are your one-stop shop for pump and motor repair. Ultimately, through our partnerships with major pump and motor OEMs and other select vendors, we have the tools to get the job done right, providing greater reliability and increased performance.

Proven field services

AREVA’s field engineers solve all types of problems on virtually every type of OEM pumps and motors, efficiently and safely. We’ve completed hundreds of pump and motor projects in the U.S., and even more worldwide.

We offer specialty resources and repairs tailored to your plant. We provide unmatched on site support to all of our customers and with years of technical engineering expertise, and an extensive repertoire, to get you back online – quickly and safely.
AREVA JSPM

THE RCP EXPERT

AREVA JSPM uses an integrated business model and the skillsets centralised at a single site to:

• Design and manufacture RCPs as we have done for more than 40 years (250 RCPs built to date)
• Ensure our clients benefit from our valuable maintenance experience of more than 400 RCPs worldwide
• Provide a team of experts in all fields (mechanics, electrics, hydraulics, etc.), ready to mobilise at a moment’s notice

Key Facts and Figures

• 770 Staff (25% Engineers and Executives, 50% Technicians, Administrators and First-Line Supervisors, and 25% Qualified Plant Workers)
• Tens of thousands of spare part references
• Cutting-edge tools and machinery
• 4,000 m² hot workshop (SOMANU)
• 120,000 hours’ maintenance and more than 30 high added-value technical interventions per year, throughout the world.
MONITORING AND DIAGNOSTICS

With a team of 12 experts, JSPM has carried out a Failure Modes, Effects and Critical Analysis (FMECA). This analysis was used to draw up a hierarchy for the functions performed by the RCP, to identify more than 300 potentially critical events and to determine more than 60 parameters that need to be monitored on a permanent basis.

- Engineering: assistance with defining the parameters to monitor during operation and in outage
- Instrumentation: using existing sensors, adding new sensors, etc.
- Diagnostics: analyzing warning signs of a deterioration and recommendations for corrective maintenance
- Maintenance Engineering: support with optimizing maintenance programs

The duration of the contract and the degree of instrumentation and diagnostics are flexible.
Commissioned during the second half of 2010, a Test Centre with a full flow test loop enables the RCPs to be tested under actual operating conditions (pressure and temperature). These full flow tests supply all the operating characteristics (capacity, operating pressure and operating temperature of the pump). Thanks to this loop, AREVA JSPM ensures the precision of the RCP characteristics.

This loop can also be used for other purposes:

- Assessment of the RCP behaviour under different conditions (steady operations, thermal transient, incidents)
- Verification of the validity of certain operating assumptions
- Evaluation of specific requirements (customers, regulators)
- Advanced Research Programs on RCP components lifecycle, condition-based monitoring, instrumentation, etc.
AREVA’S NUCLEAR PARTS CENTRE (NPC)

REACTOR COOLANT PUMP, MOTOR & SEAL HARDWARE

NPC and Jeumont – Unmatched Field-proven Experience

When it comes to your nuclear facility’s safe, efficient equipment operations, AREVA understands you need access to critical parts 24/7. That’s why our Nuclear Parts Centre (NPC), based in Lynchburg, Va., has teamed up with AREVA Jeumont, a wholly-owned subsidiary in northern France, to provide reactor coolant pump (PHT) motor and seal hardware to customers in North America. For more than 30 years, AREVA Jeumont has been designing and manufacturing reactor coolant pumps, motors and seals for the French and international nuclear markets.

With more than 220 complete sets of RCPs, motors and seals in operation throughout the world, AREVA Jeumont has an accumulated experience feedback equivalent to over 2,300 years of operation.

Reactor Coolant Pump Seal Hardware

NPC-supplied parts are currently in operation in more than half of the U.S. Pressurized Water Reactor (PWR) nuclear plants featuring the Westinghouse Model 93, 93A, 93A1 and 100 PHTs. Several U.S. utilities have signed long-term contracts with NPC, ensuring an emergency supply of hardware on hand at all times.

With more than $5M in inventory, the NPC stands ready 24-7 to support same day or next day shipments as needed. Just-in-time deliveries help customers minimize on-site inventory and associated carrying costs, resulting in substantial savings.
Our Lynchburg, Va., inventory availability is accessible via our dedicated NPC Customer Inquiry System on the World-Wide Web. (www.us.areva-np.com/cisweb)

**Reactor Coolant Pump & Motor Hardware**

Our NPC stocks a large quantity of PHT and motor hardware for Westinghouse-style pumps and motors. Design innovations include enhanced thrust bearings, pads, pins and spacers – extending longevity while decreasing motor inspection and rebuild frequencies. We can fabricate long-lead special order items (PHT internals and upgraded RCP motor stators) to your specific requirements.

**Focus on Quality**

AREVA focusses only on the highest quality PHT, motor and seal hardware – for all levels of safety classifications. We supply all items in accordance with the applicable portions of our approved Quality Assurance Program which meets the requirements of NCA 3800 and 10CFR50 Appendix B.

**Technical Support**

AREVA’s dedicated team of design, test and fabrication engineers can address any emergent needs at your plant.
About AREVA Canada

AREVA has been in Canada for more than 40 years and has a presence in several Canadian provinces and Nunavut. AREVA Canada has more than 600 employees and contractors in several locations across the country that are engaged in exploration, mining, manufacturing and solutions for CO₂-free power generation. A leader in Canada’s uranium production, AREVA is also a major player in the manufacture of radiation measuring equipment, and as a services and engineering provider for Canadian nuclear reactors.

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